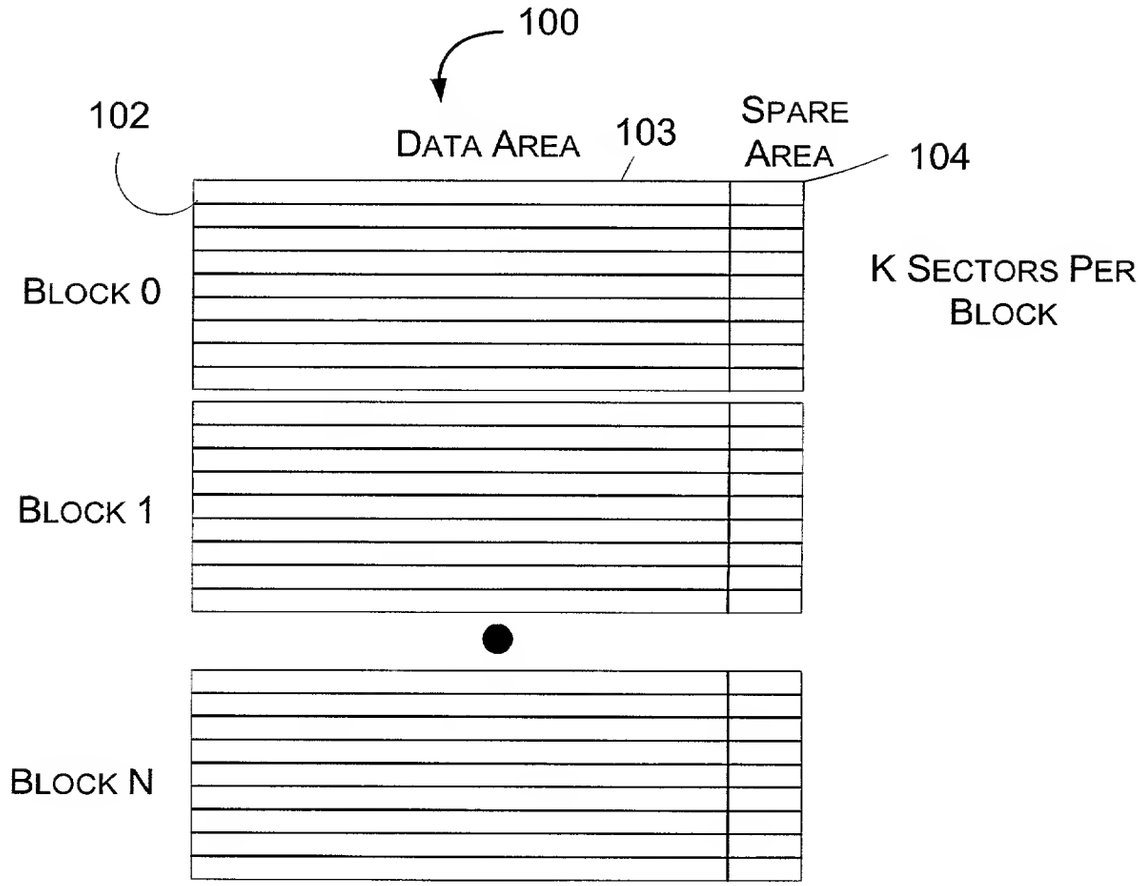
100
102
DATA AREA
103
SPARE AREA
104
BLOCK 0
K SECTORS PER BLOCK
BLOCK 1
BLOCK N

Fig. 1

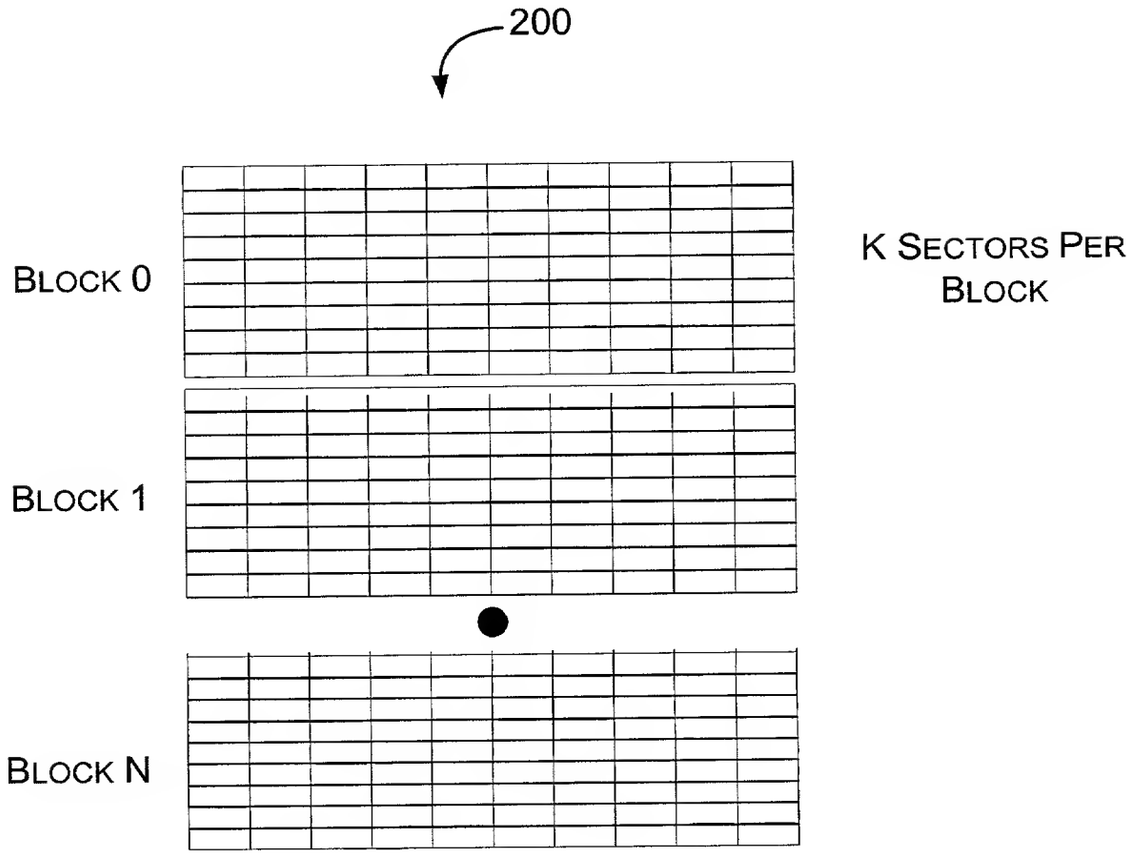

Fig. 2

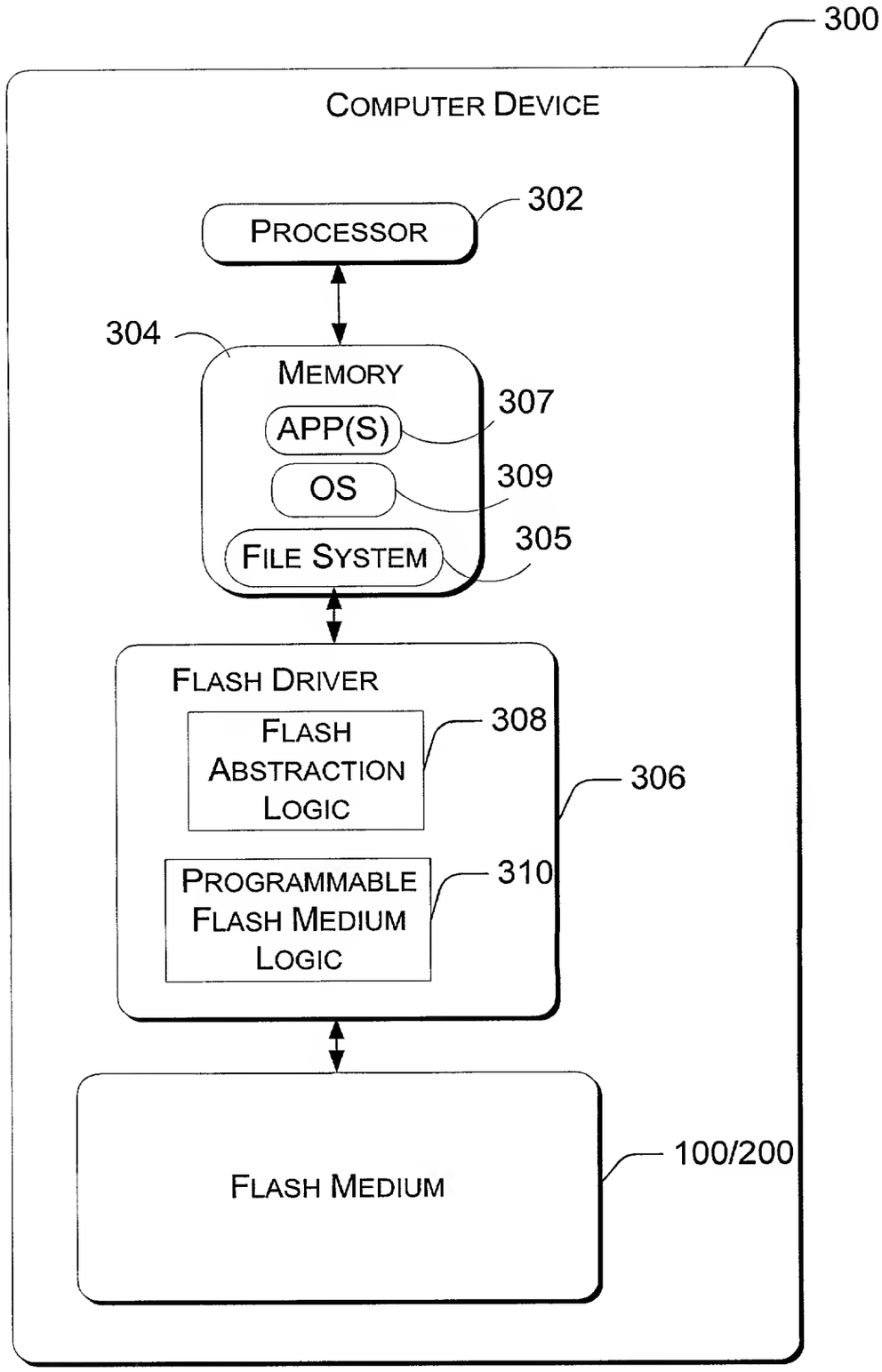
300
COMPUTER DEVICE
PROCESSOR
302
304
MEMORY
APP(S)
307
OS
309
FILE SYSTEM
305
FLASH DRIVER
FLASH ABSTRACTION LOGIC
308
306
PROGRAMMABLE FLASH MEDIUM LOGIC
310
FLASH MEDIUM
100/200

Fig. 3

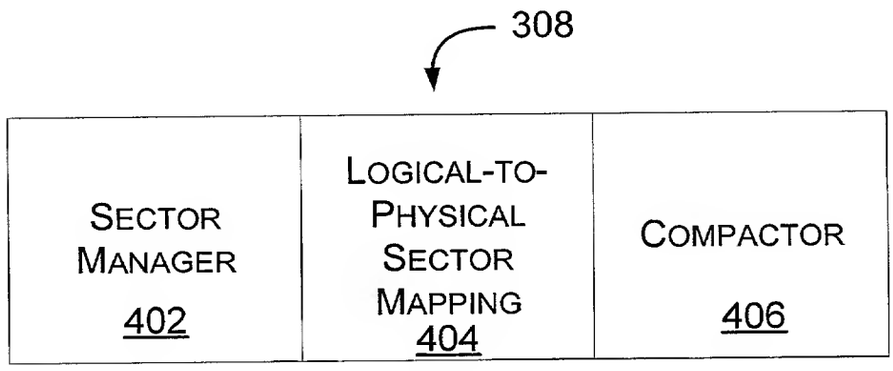

Fig. 4

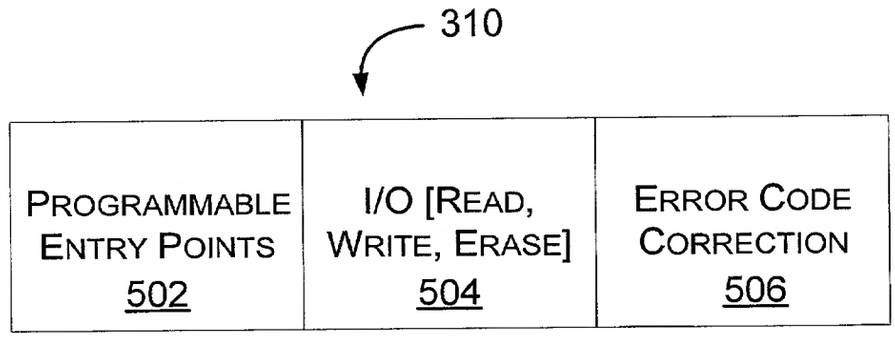

Fig. 5

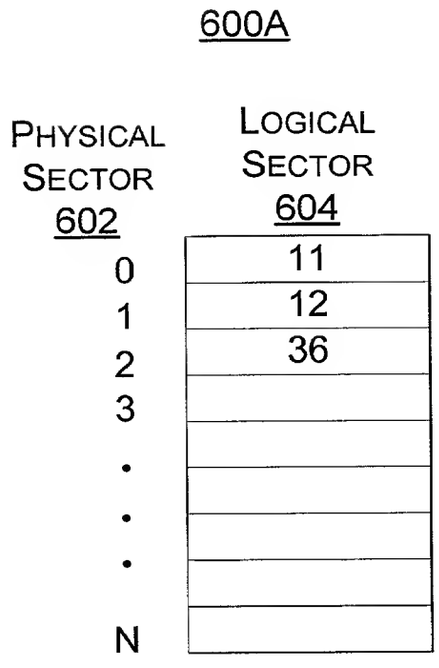

Fig. 6A

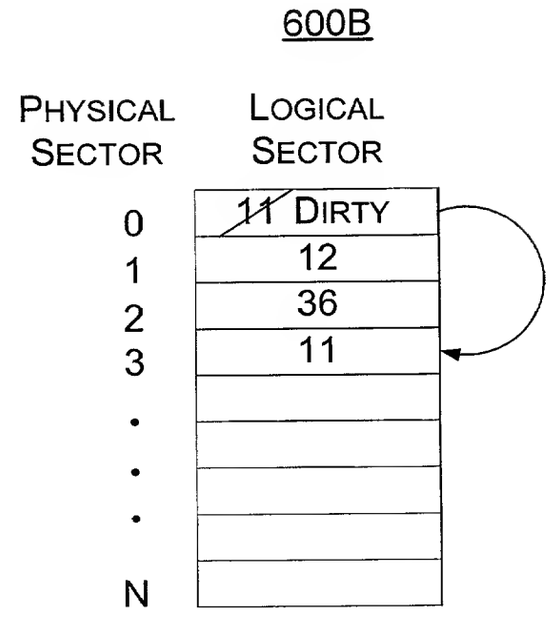

Fig. 6B

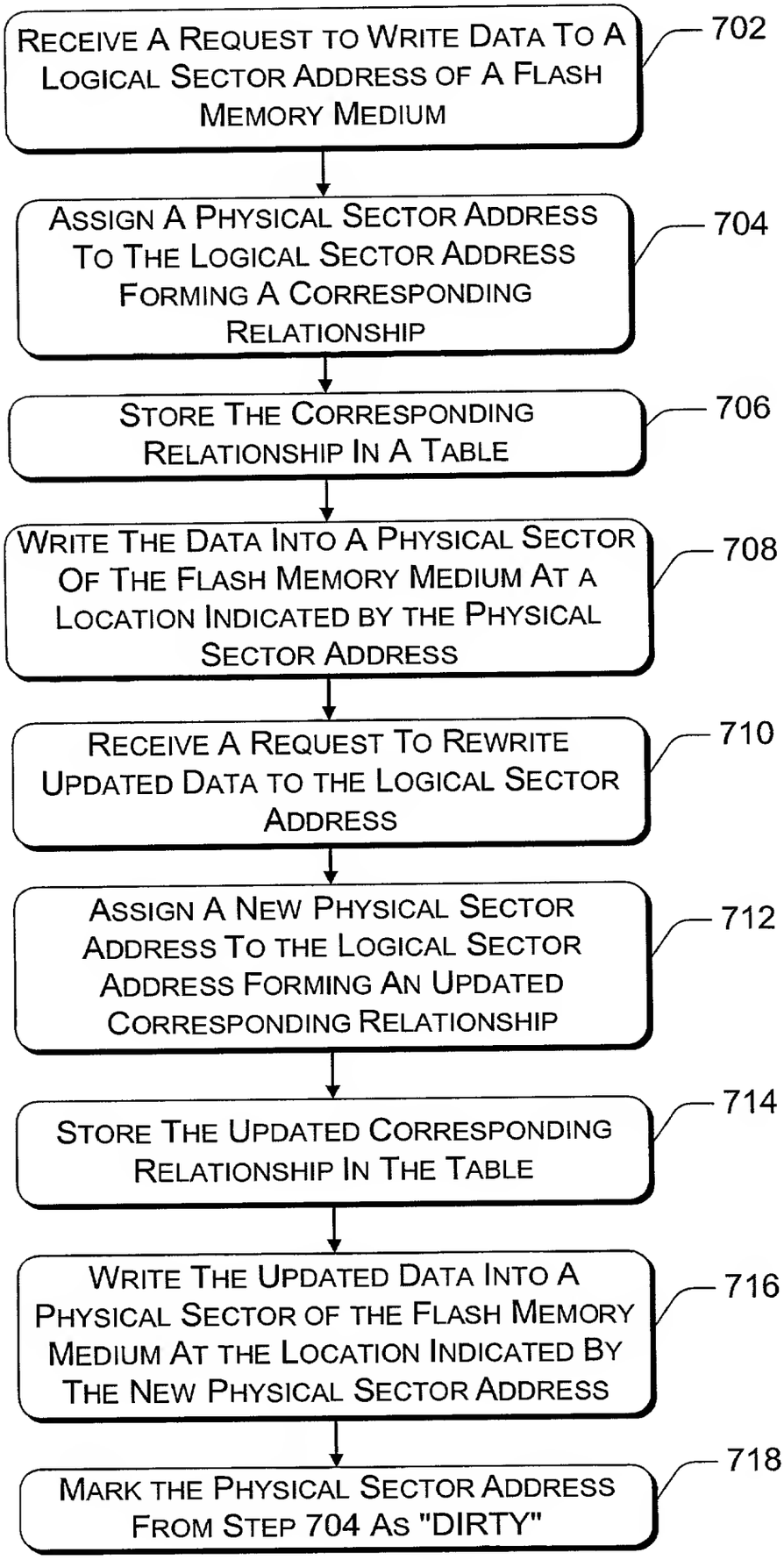
700
RECEIVE A REQUEST TO WRITE DATA TO A LOGICAL SECTOR ADDRESS OF A FLASH MEMORY MEDIUM
702
ASSIGN A PHYSICAL SECTOR ADDRESS TO THE LOGICAL SECTOR ADDRESS FORMING A CORRESPONDING RELATIONSHIP
704
STORE THE CORRESPONDING RELATIONSHIP IN A TABLE
706
WRITE THE DATA INTO A PHYSICAL SECTOR OF THE FLASH MEMORY MEDIUM AT A LOCATION INDICATED BY THE PHYSICAL SECTOR ADDRESS
708
RECEIVE A REQUEST TO REWRITE UPDATED DATA TO THE LOGICAL SECTOR ADDRESS
710
ASSIGN A NEW PHYSICAL SECTOR ADDRESS TO THE LOGICAL SECTOR ADDRESS FORMING AN UPDATED CORRESPONDING RELATIONSHIP
712
STORE THE UPDATED CORRESPONDING RELATIONSHIP IN THE TABLE
714
WRITE THE UPDATED DATA INTO A PHYSICAL SECTOR OF THE FLASH MEMORY MEDIUM AT THE LOCATION INDICATED BY THE NEW PHYSICAL SECTOR ADDRESS
716
MARK THE PHYSICAL SECTOR ADDRESS FROM STEP 704 AS "DIRTY"
718

Fig. 7

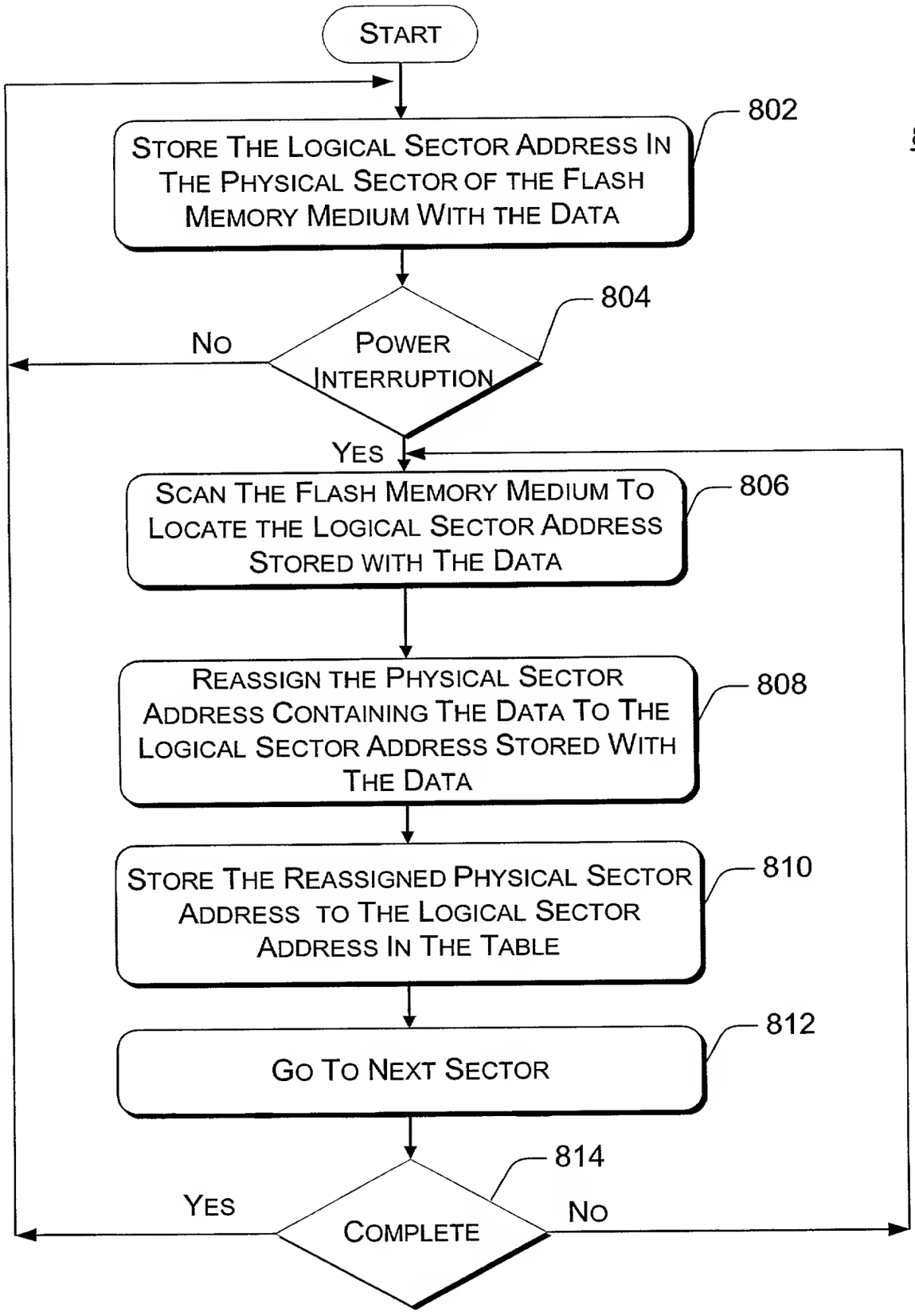
START
STORE THE LOGICAL SECTOR ADDRESS IN THE PHYSICAL SECTOR OF THE FLASH MEMORY MEDIUM WITH THE DATA
802
800
POWER INTERRUPTION
804
NO
YES
SCAN THE FLASH MEMORY MEDIUM TO LOCATE THE LOGICAL SECTOR ADDRESS STORED WITH THE DATA
806
REASSIGN THE PHYSICAL SECTOR ADDRESS CONTAINING THE DATA TO THE LOGICAL SECTOR ADDRESS STORED WITH THE DATA
808
STORE THE REASSIGNED PHYSICAL SECTOR ADDRESS TO THE LOGICAL SECTOR ADDRESS IN THE TABLE
810
GO TO NEXT SECTOR
812
COMPLETE
814
YES
NO

Fig. 8

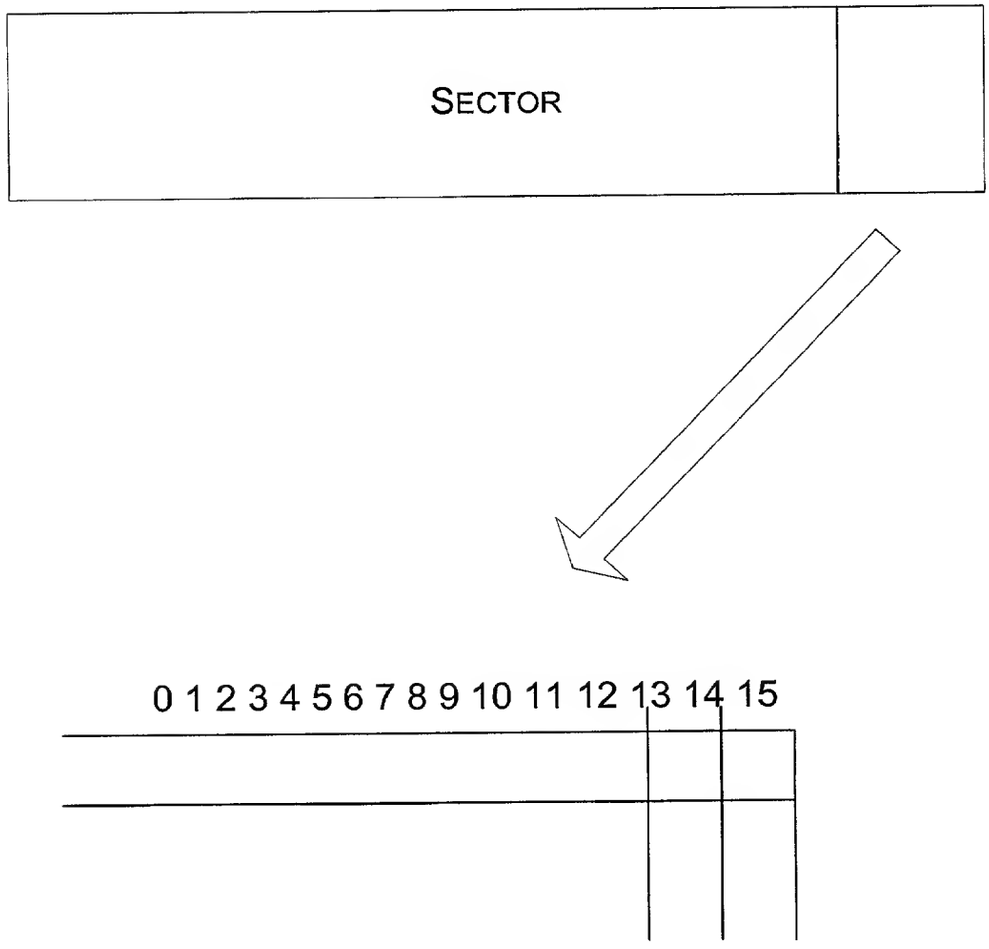

Fig. 9

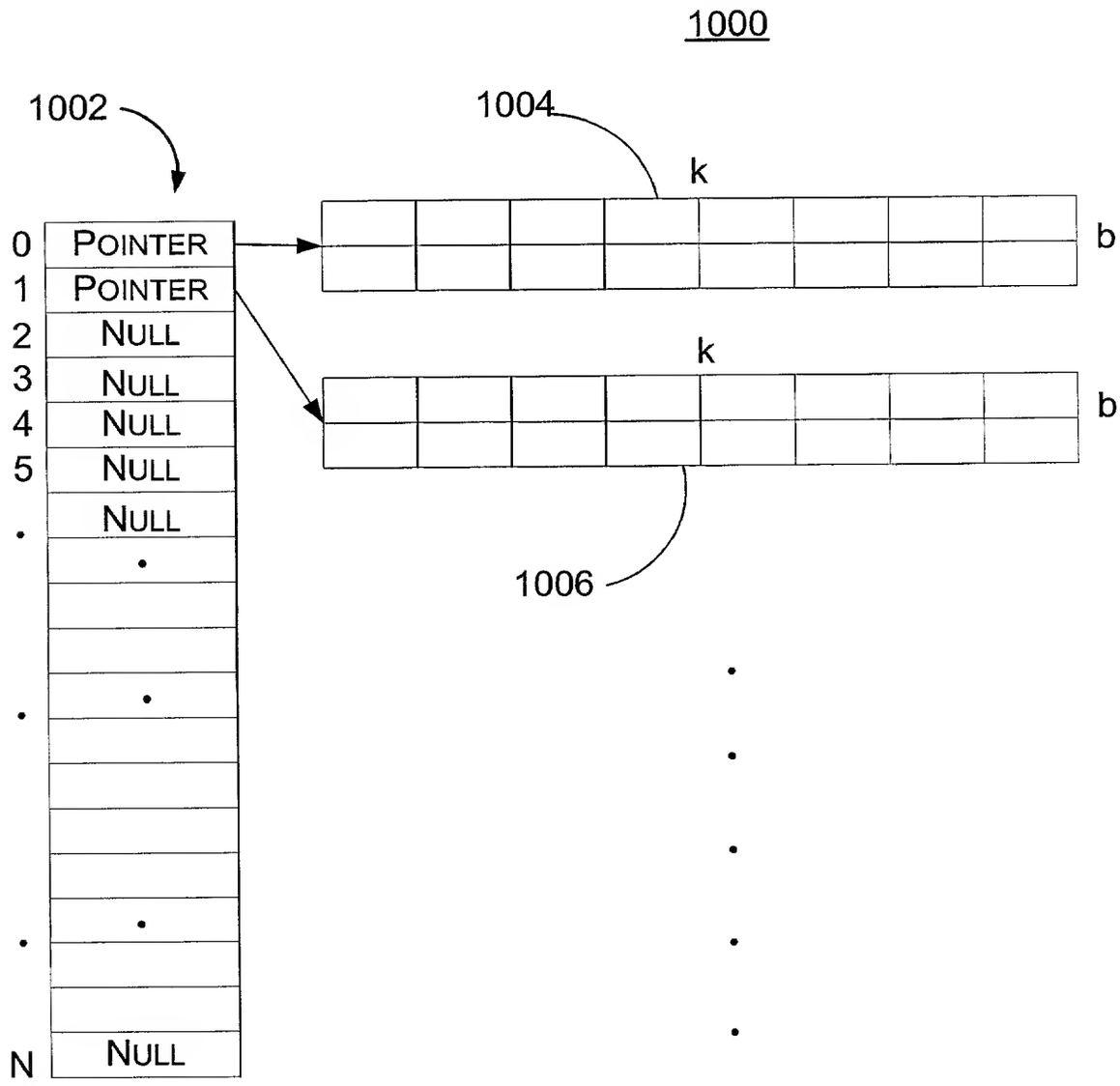
1000
1002
1004
k
b
0
POINTER
1
POINTER
2
NULL
3
NULL
4
NULL
5
NULL
NULL
k
b
1006
N
NULL

Fig. 10

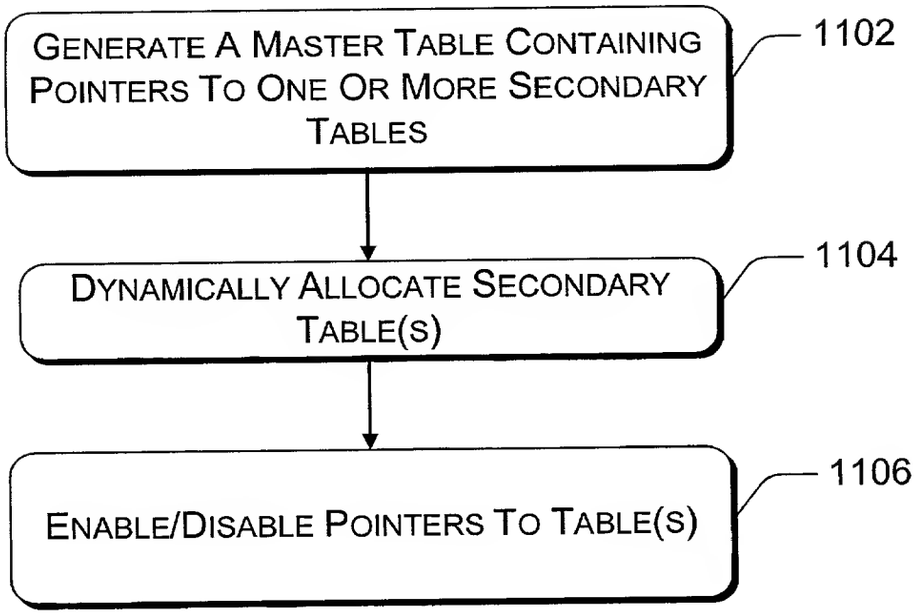
GENERATE A MASTER TABLE CONTAINING POINTERS TO ONE OR MORE SECONDARY TABLES
1102
1100
DYNAMICALLY ALLOCATE SECONDARY TABLE(S)
1104
ENABLE/DISABLE POINTERS TO TABLE(S)
1106

Fig. 11

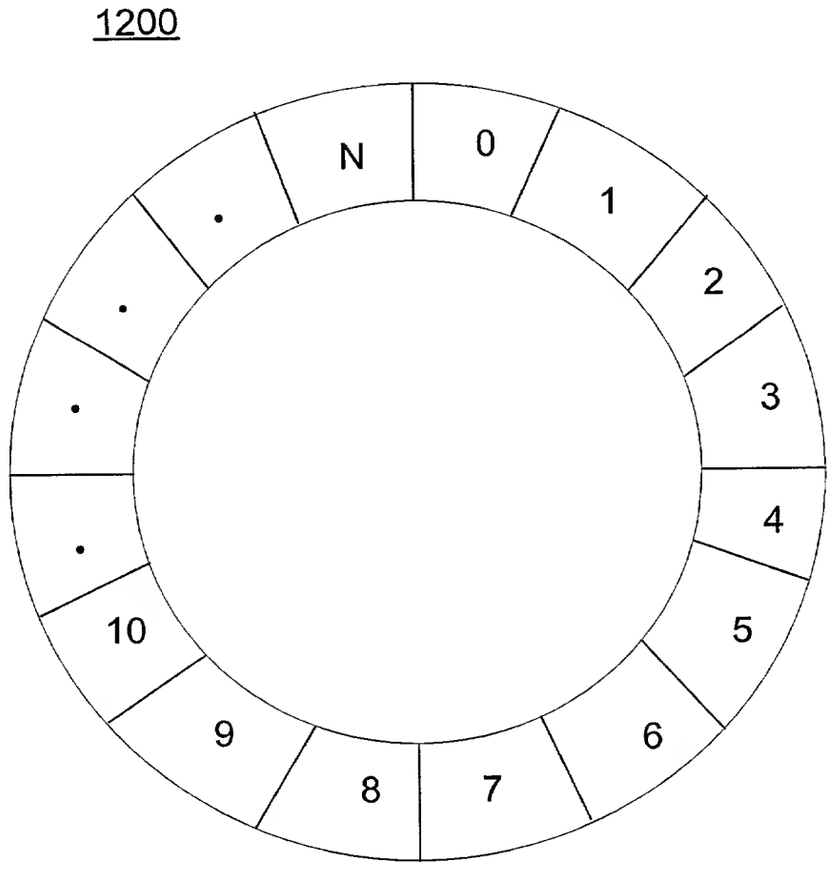
1200
0
1
2
3
4
5
6
7
8
9
10
N

Fig. 12

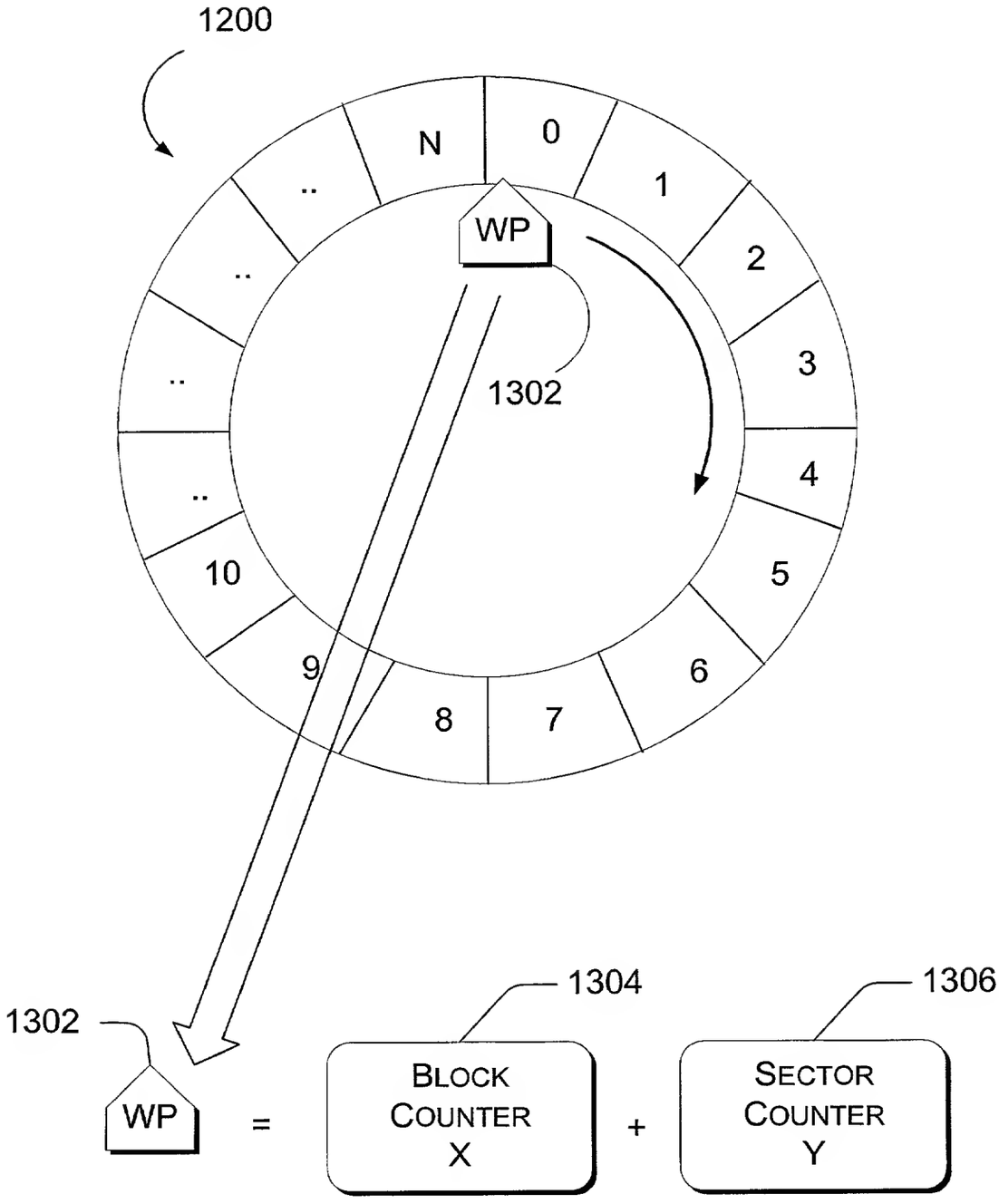
1200
N
0
1
2
3
4
5
6
7
8
9
10
..
..
..
..
WP
1302
1302
WP
=
1304
BLOCK COUNTER X
+
1306
SECTOR COUNTER Y

Fig. 13

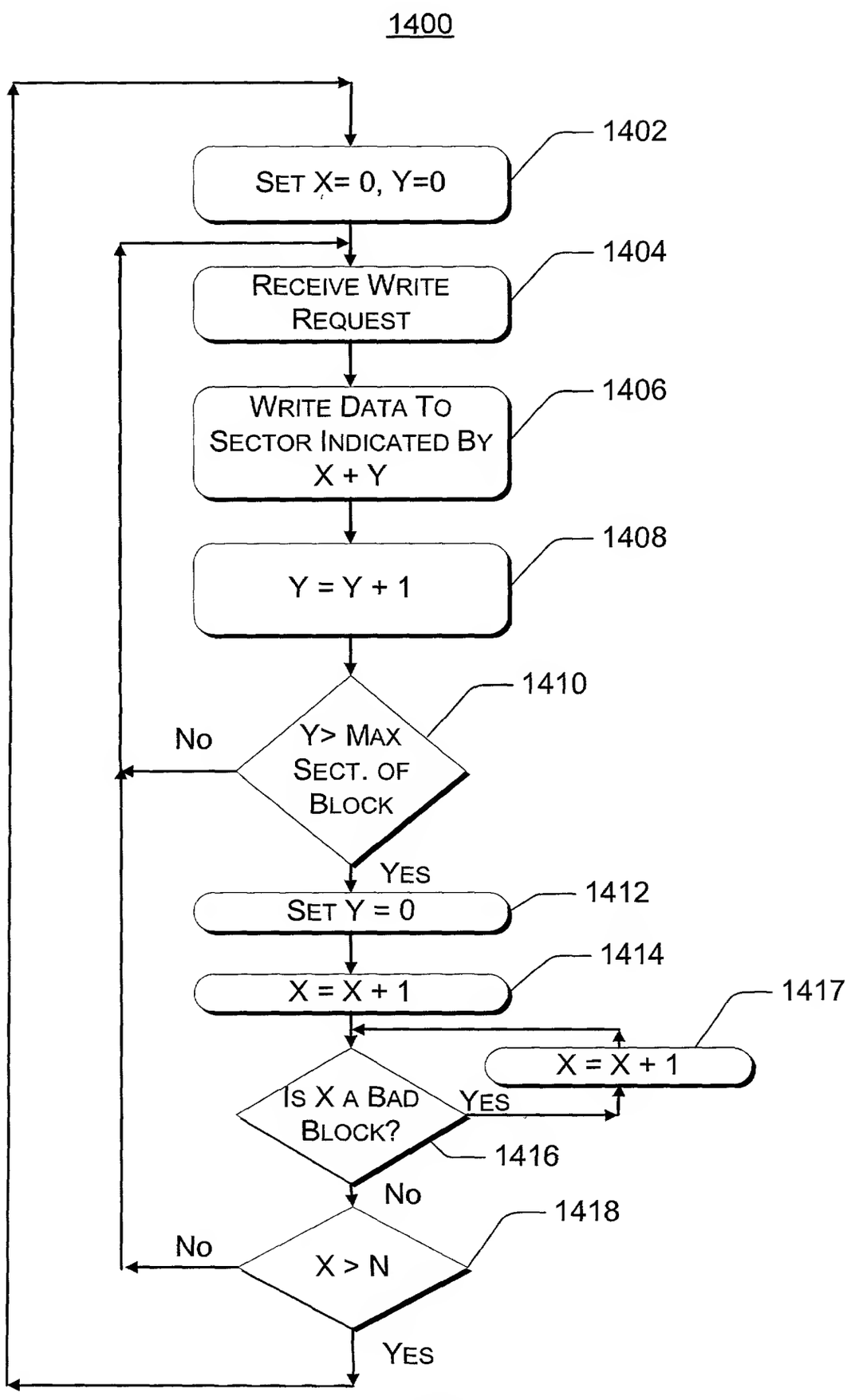
1400
1402
SET X= 0, Y=0
1404
RECEIVE WRITE REQUEST
1406
WRITE DATA TO SECTOR INDICATED BY X + Y
1408
Y = Y + 1
1410
Y> MAX SECT. OF BLOCK
No
YES
1412
SET Y = 0
1414
X = X + 1
1417
X = X + 1
IS X A BAD BLOCK?
YES
1416
No
1418
X > N
No
YES

Fig. 14

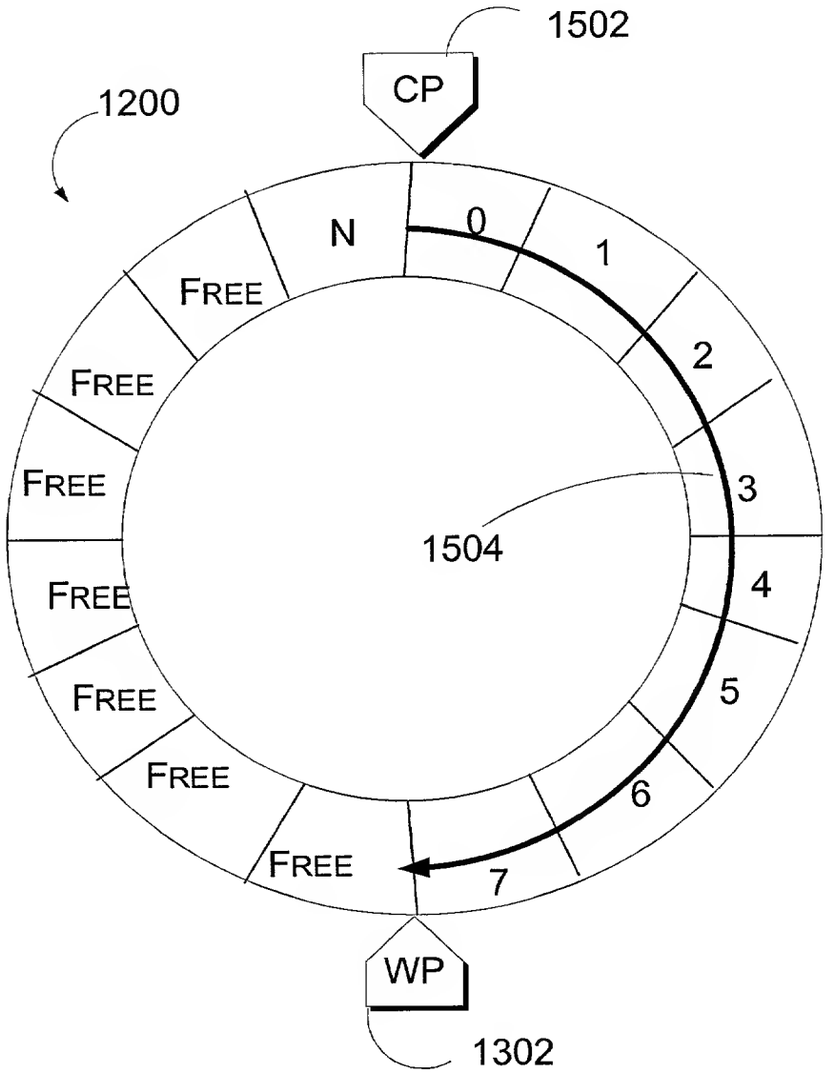
1502
CP
1200
N
0
1
2
3
4
5
6
7
FREE
FREE
FREE
FREE
FREE
FREE
FREE
1504
WP
1302

Fig. 15

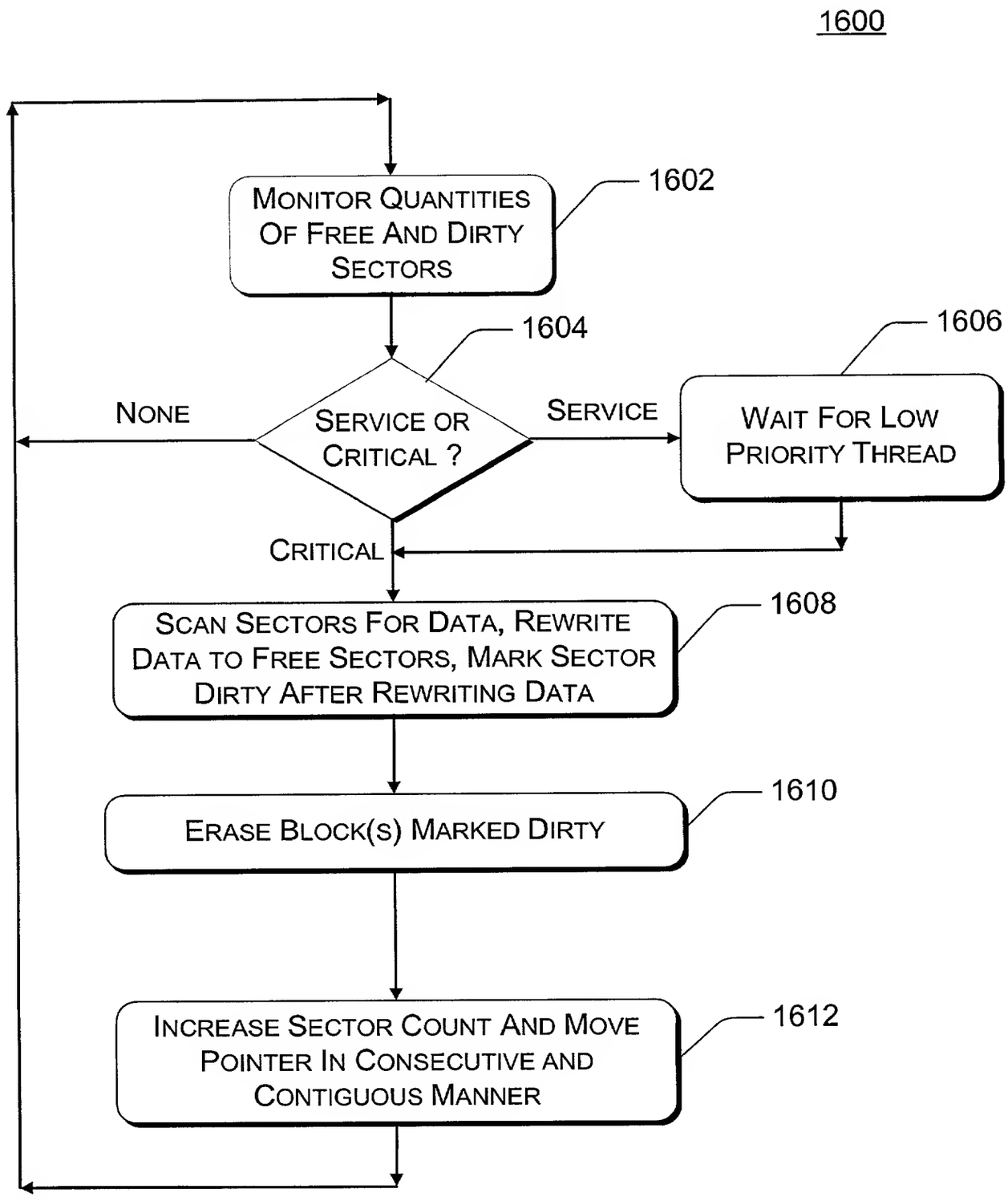
1600
MONITOR QUANTITIES OF FREE AND DIRTY SECTORS
1602
1604
SERVICE OR CRITICAL ?
NONE
SERVICE
1606
WAIT FOR LOW PRIORITY THREAD
CRITICAL
SCAN SECTORS FOR DATA, REWRITE DATA TO FREE SECTORS, MARK SECTOR DIRTY AFTER REWRITING DATA
1608
ERASE BLOCK(S) MARKED DIRTY
1610
INCREASE SECTOR COUNT AND MOVE POINTER IN CONSECUTIVE AND CONTIGUOUS MANNER
1612

Fig. 16

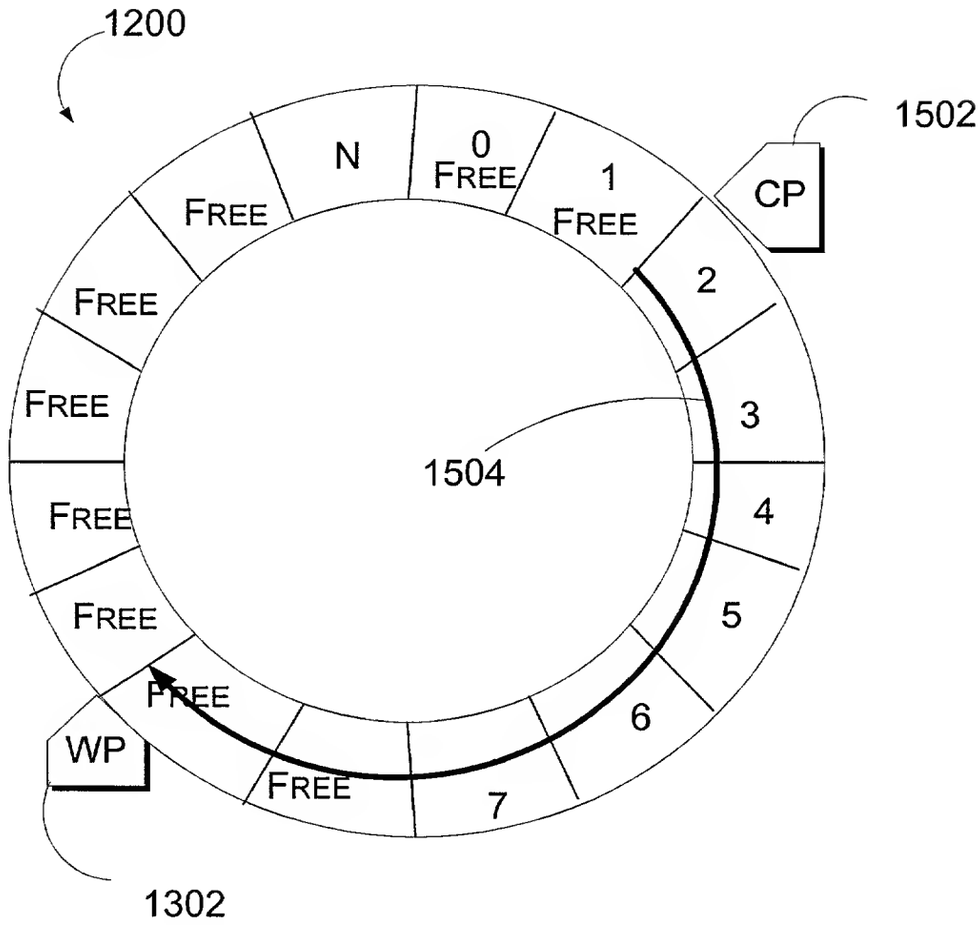
1200
1502
N
0
FREE
1
FREE
CP
FREE
2
FREE
3
FREE
1504
FREE
4
FREE
5
FREE
6
WP
FREE
7
1302

Fig. 17

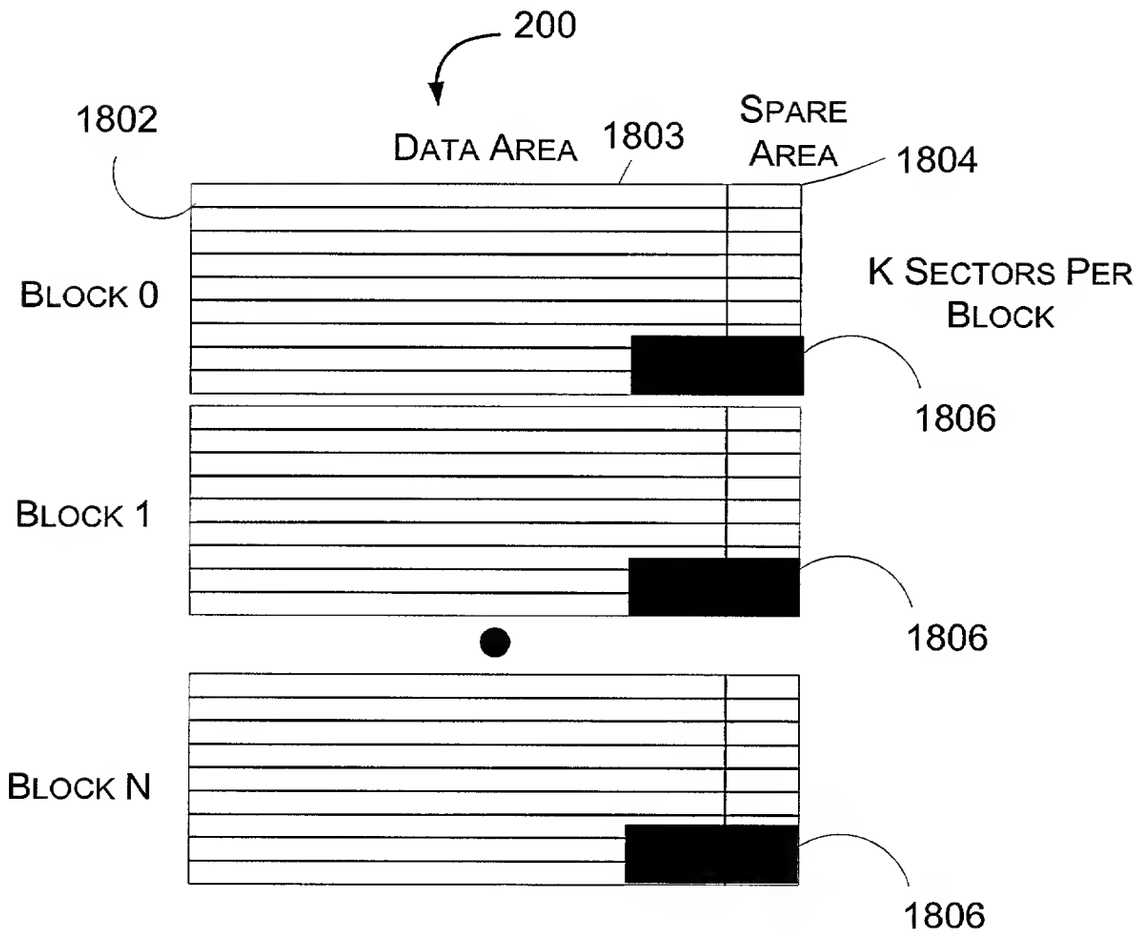
200
1802
DATA AREA
1803
SPARE AREA
1804
BLOCK 0
K SECTORS PER BLOCK
1806
BLOCK 1
1806
BLOCK N
1806

Fig. 18